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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/676,696
Filing Date	September 29, 2000
First Named Inventor	RECHBERGER, David L.
Art Unit	2872
Examiner Name	LAVARIAS, Arnel C.
Total Number of Pages in This Submission: 13	Attorney Docket Number: 0013 P00811-US

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Response to Missing Parts/ Incomplete Application
  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
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- [ ] Terminal Disclaimer
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- [ ] CD, Number of CD(s) _____
- [ ] After Allowance communication to Technology Center (TC)
- [x] Appeal Communication to Board of Appeals and Interferences
- [ ] Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
- [ ] Proprietary Information
- [ ] Status Letter
- [ ] Other Enclosure(s) (please identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Mark E. Tetreault
Signature	
Date	August 9, 2004

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Typed or printed name	Mark E. Tetreault	via fax (703) 872-9306 - 13 pages total	
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PTO/SB/17 (10-03)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 330.00

Complete if Known	
Application Number	09/676,696
Filing Date	September 29, 2000
First Named Inventor	RECHBERGER, David L.
Examiner Name	LAVARIAS, Amel C.
Art Unit	2872
Attorney Docket No.	O013 P00811-US

METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☑ Deposit Account:

Deposit Account Number: 02-0900

Deposit Account Name: Barlow, Josephs & Holmes

The Director is authorized to: *(check all that apply)*

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below	Fee Paid
Total Claims		-20** =		=
Independent Claims		- 3** =		=
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330.00
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 330.00

SUBMITTED BY

Name (Print/Type)	Mark E. Tetreault	Registration No. (Attorney/Agent)	46,289	Telephone	401 273-4446
Signature				Date	August 9, 2004

(Complete *(if applicable)*)

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Serial No. 09/676,696

PATENT
ART UNIT 2872
Serial No: 09/676,696

CERTIFICATE OF FACSIMILE TRANSMISSION

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Date: August 9, 2004 Pages: 12

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	RECHBERGER, David L.
Serial No:	09/676,696
Filed:	September 29, 2000
Title:	USE OF CHIP ON BOARD TECHNOLOGY TO MOUNT OPTICAL DEVICES...
Docket No:	O013 P00811-US
Examiner:	LAVARIAS, Arnel C.
Art Unit:	2872

APPELLANT'S BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REAL PARTIES IN INTEREST

The real party in interest is Optical Communication Products, Inc., a Delaware corporation having a principal place of business at 6101 Variel Avenue, Woodland Hills, CA 91367, by assignment of 100% interest in the subject application.

RELATED APPEALS AND INTERFERENCES

There are no related or co-pending appeals or interferences related to the appeal of this application.

STATUS OF CLAIMS

Claim 60 is currently pending. Claim 60 stands as finally rejected. Claim 60 is being appealed.

STATUS OF AMENDMENTS

No amendments were filed after the Final Rejection. The claims stand as presented under the Final Rejection.

SUMMARY OF THE INVENTION

The present invention is directed to novel packaging systems for mounting high speed electro-optical device onto circuit substrates while integrating multiple interface options. Specifically, the present invention as embodied in the only pending claim in the present application, Claim 60, is directed to an integrated electro-optical device that includes an electro-optical transmitter or receiver that is affixed to a circuit substrate with a housing formed directly thereon and including interface and beam redirection means embedded therein. The present invention is directed at overcoming many of the assembly and material cost drawbacks found in the prior art and is particularly directed at overcoming the specific drawbacks found in the prior art packages such as those in the primary reference cited by the Examiner. In the prior art packaging included TO cans, butterfly packages, mini-DIL's, etc., all of which required restrictive handling and assembly creating difficulties in automating the downstream assembly process.

In accordance with the present invention, the preferred embodiment of the present invention and the claimed invention that is subject to this appeal is particularly illustrated in Figs. 9 and 10. As can be seen an electro-optical device is mounted directly onto a circuit substrate and connected thereto. In this manner, an electro-optical device is essentially formed directly on the substrate thereby eliminating the TO header pins thereby reducing the wire bond distance to improve high speed performance and allowing the integration of a large monitoring photodetector directly within the TO package itself while maintaining a compact package size. The electro-optical device is then encapsulated with an optical grade polymer that includes an integrally molded beam splitter and a fiber interface coupling. All of these components are formed in a single molding step while also serving to fully encapsulate the electro-optical-device and seal the entire assembly against the substrate.

It can therefore be seen that the present invention provides a highly compact assembly that can be easily manufactured and assembled as compared to the prior art. Further the present invention provides a device that can operate at higher speeds with greater reliability as compared to the devices in the prior art.

ISSUES ON APPEAL

The following issue is presented for review in this appeal:

Whether claim 60 was properly rejected under 35 USC §103(a) as being unpatentable over US Patent No. 5,515,468 (DeAndrea) in view of US Patent No. 4,901,329 (Leas) in further view of US Patent No. 4,114,177 (King).

GROUPING OF CLAIMS

Only a single independent claim, claim 60, is at issue in the present appeal. Accordingly, no claim grouping is required.

ARGUMENT

Claim 60 was rejected under 35 U.S.C. §103(a) as being unpatentable over US Patent No. 5,515,468 (DeAndrea) in view of US Patent No. 4,901,329 (Leas) in further view of US Patent No. 4,114,177 (King). The Examiner's complete basis for the rejections can be found on pages 4-6 of the Final Rejection, dated March 18, 2004. The Applicant submits that the present invention, as currently recited in pending claim 60, is not prima facie obvious over the combination of DeAndrea and Leas and King for the reasons discussed below.

For convenience, the Examiner's basis for the rejection is restated below with the Applicant's comments inserted where appropriate.

> "*DeAndrea et al. discloses an optical device package (See Figures 12, 13, 14) comprising a substrate (See for example bottom surface of 30 attached to 17 in Figure 14) having a mounting surface (See for example 17 in Figure 14); an optoelectronic device (See for example 10 in Figure 14) having a lower mounting surface operably coupled to the mounting surface of the substrate wherein the optoelectronic device is in*

electrical communication with the substrate (See for example connection wire from 30 to 16 in Figure 14); the optoelectronic device further having an active upper surface disposed substantially parallel to the mounting surface of the substrate (See for example 17 and 30 in Figure 14) and being configured to emit or receive light normal to the active upper surface (See for example 30 in Figure 14); a fiber coupling assembly having a body portion that encapsulates the optoelectronic device (See 40/70 in Figure 14);

Claim 60 however requires that the optoelectronic device be embedded within the body portion. The Applicant made this change in the last response by changing the term "encapsulate" to "embed" which is believed to more accurately reflect the intended scope of the claim. In the case of DeAndrea, the fiber coupling assembly and cover component is a molded part, but it is not molded "integrally" with the optoelectronic device. The coupling assembly 40/70 in DeAndrea is molded entirely separately from the optoelectronic device. Once the assembly is molded, other small components are installed such as a lens assembly 150 for redirecting the light, and the assembly is installed as a cover. In DeAndrea, the optoelectronic device 30 is first mounted onto a circuit board 15, the circuit board 15 is then inserted into a cavity in the bottom of the molded part 40/70 and the entire assembly is then sealed. The circuit board and the housing 40/70 are clearly separate parts as shown in the drawings. This type of assembly is precisely the type off prior art assembly that the present invention was developed to overcome. The DeAndrea device requires extensive handling of miniscule components in order to assemble the module making automated processing near to impossible and creating a high number of defective parts as a result of improper handling during assembly.

The term "embed" as used in the claim of the present invention is intended to reflect that the "fiber coupling assembly" is integrally molded directly over and around the optoelectronic device. The fiber coupling assembly is fully mated to the optoelectronic device and the surrounding substrate thereby causing the optoelectronic device to be embedded within the fiber coupling assembly, not simply housed within the fiber coupling assembly.

the fiber coupling assembly further having a barrel portion extending from the body portion in a direction substantially parallel to the substrate, the barrel portion being configured to operably engage a fiber optic cable (See Figures 11 and 14; col. 3, lines 49-59; col. 10, lines 35-44);

DeAndrea discloses a housing assembly (molded part 40/70) that includes a barrel portion for accepting a fiber. As stated with particularity above, the present invention claims that the fiber coupling assembly is integrally molded over the optoelectronic device thereby embedding the optoelectronic device within the fiber coupling assembly and that this assembly includes a barrel portion. This can be contrasted with the disclosure in DeAndrea wherein a housing 40/70 has a barrel for accepting a fiber wherein the housing is installed onto a circuit substrate adjacent an optoelectronic device.

the fiber coupling assembly further having a planar mirror encapsulated within the body portion of the fiber coupling assembly to reflect light traveling within the body portion (See for example 310 in Figure 14); and

As indicated above with respect to the fact that the optoelectronic device is imbedded within the fiber coupling assembly, claim 60 includes the limitations that the mirror is also embedded within the fiber coupling assembly, meaning that the mirror is firmly fixed within the body of the surrounding mass. DeAndrea discloses a mirror structure that is simply installed into an opening within the outer housing structure. It must be emphasized that in viewing the DeAndrea disclosure, the device required that three separate and distinct components, the housing 40/70, the lens assembly 150 and the housing jacket 170 must be first assembled before the housing is installed over the circuit substrate. During this assembly process, a process that cannot be automated, a person must handle all three parts while keeping them clean and precisely aligned and then install the assembly over the circuit substrate. This process is slow, labor intensive, expensive, difficult and results in a high percentage of defective parts. Again, the present invention was conceived to overcome precisely the limitations found in this process.

The Examiner then states that:

DeAndrea et al. lacks the fiber coupling assembly being optically transparent, the body portion of the fiber coupling assembly being configured and arranged to transmit light and being integrally molded with the optoelectronic device such that the optoelectronic device and planar mirror are embedded within the fiber coupling assembly;

and an enclosure coupled to the substrate that houses the optoelectronic device. However, Leas teaches an integrated laser array (See for example Figures 1, 4, and 6), wherein a transparent encapsulating medium (See 32 in Figure 6; col. 3, line 57-col. 4, line 49) is used to surround all the components (i.e. for example the laser 20 and planar routing mirrors 28' and 28" in Figure 6) while allowing the light emitted from the laser to be transmitted within the transparent encapsulating medium. The combined teachings of DeAndrea and Leas lack an enclosure coupled to the substrate that houses the optoelectronic device. However, the use of an enclosure to house optoelectronic devices is well known in the art. For example, King teaches an optical coupled device (See for example Figures 2-3) including optoelectronic devices (See 12, 16 in Figure 2 for example) embedded in an optically transparent material (See for example 20 in Figure 2), wherein an additional housing is disposed around the optically transparent material to house the optoelectronic devices (See for example 26 in Figure 2) . Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the fiber coupling assembly be optically transparent, the body portion of the fiber coupling assembly being configured and arranged to transmit light and being integrally molded with the optoelectronic device such that the optoelectronic device and planar mirror are embedded within the fiber coupling assembly; and an enclosure be coupled to the substrate that houses the optoelectronic device , as taught by Leas and King, in the optical device package of DeAndrea et al.

The Applicant disagrees with the Examiner's determination of obviousness. In order to combine references for a teaching of obviousness, one of the references must suggest or teach that the combination is beneficial or desirable. The simple statement that Leas can be combined with DeAndrea to reduce scattering and Fresnel losses ignores the complex nature of transmitting light through coupling mediums. All of the transmission or redirection structures are first formed on the circuit substrate in the Leas laser array and then covered in a transparent potting compound encapsulant. Each component is formed by depositing and etching the various layers and components necessary to form the laser array in Leas. Areas or critical light transmission or redirection are formed in a very specific manner with precisely selected optical properties and indices. Once all of the critical elements are formed using this process, a final

layer of potting compound is then placed over the whole assembly. It is important to note that typical potting materials used simply for protection are not selected for their optical transmissive qualities because the emitting device and the light path, as disclosed in Leas is fully set and stabilized prior to potting. This was also the case with Albaugh as previously cited. Albaugh used a fiber within the package to bring the light from the device to the outside. The potting material surrounded the fiber and was not intended to be optically transmissive for the purpose of transmitting light, but only to serve as a mechanism for retaining and protecting the fiber stub. Potting of an optical device must take into consideration that the characteristics of the emitted light change when transmitted through a coupling medium.

DeAndrea discloses an optoelectronic device that transmits through air within the housing and then is refocused through a lens/mirror structure. There is no teaching or suggestion to entirely embed the optoelectronic device in an optically transparent material which would also be molded to form the fiber coupling portion. Clearly, this was not anticipated because the coupling medium used is air. Potting is used only as a hermitic sealing medium at the juncture between the housing and the circuit substrate. The use of potting for protection alone as is provided in this reference would not teach that the material should be optically transmissive, nor would it teach to form the fiber coupling as part of the housing.

The Examiner has cited that Leas fills the gaps in DeAndrea by showing an optically transmissive potting material having the laser and mirror structures within the potting material. However, as indicated above, it is submitted that there is no motivation in DeAndrea for the combination. Even if the Examiner can show a general presumption that potting alone is a sufficient motivating factor for the combination, such a combination would only teach that the interior space in the housing of DeAndrea should be filled with an optically transparent potting material. One skilled in the art would not have the motivation to fill the cavity of the DeAndrea housing with transmissive potting compound and further even if they did, they would not arrive at the present invention, because as was the case in Leas, all of the critical elements would be fixed in place first and an in active potting compound then installed As indicated above, this blanket assumption ignores the complex change in the characteristics of the light emitted from the optoelectronic device that may occur if the enclosure is simply filled with a protective (optically transmissive) material. Behavior and performance of the device are sure to be affected by the arrangement.

The present invention provides a unique mechanical and optical arrangement for propagating the light from the device to the end surface of the fiber with only 2 material transitions, device to encapsulant and encapsulant to air. The need for the formation of numerous intermediate active regions as provided in Leas or the need for several small components requiring assembly has been eliminated in the present invention. In the present invention, the first transition from the device itself to the encapsulation material is known in advance and is accommodated for in the production of the optoelectronic device. This is a critical distinction and needs to be given weight in the context of a motivating or non-motivating factor for the combination with Leas. Potting for protection as disclosed in the Leas reference is done without consideration to performance or optical transmission because the light is not intended to travel through a protective potting material. Leas does disclose that the laser and mirrors are within an optically transmissive material, however each one of those active regions is carefully formed before applying the potting compound. Further, the application of the teachings of Leas to DeAndrea cannot be implemented without consideration of the affect on the output of the laser device itself and accommodation for those effects.

Furthermore, neither DeAndrea, Leas nor King discloses that the potting (encapsulation) material itself be used to also integrally form the fiber coupling assembly. Leas discloses that the encapsulating material is TiO^2 which is a high index material that is deposited by chemical vapor deposition. It would not be possible to integrally mold the barrel portion of the present device from such a material. Accordingly, the DeAndrea housing would first have to be fully formed and the Leas potting compound injected into the housing. This fully ignores the limitations found within the claim of the present invention stating that the encapsulation material be formed so as to embed the optoelectronic device, a light redirection means ***and integrally form a fiber coupling assembly.*** Integrally forming the fiber coupling assembly to have a body which sits over and embeds the device and further includes a barrel ***that is formed at the same time*** for receiving the end of the fiber provides for superior alignment of the device with the fiber and is believed to reduce manufacturing and alignment issues during production. There is clearly a benefit to integrally molding the body and fiber receiving barrel from the same material at the same time in the same molding process.

In summary, the Appellants believe that the Examiner has oversimplified the determination of obviousness in combining the cited references. Appellants note that "care must

be taken to avoid hindsight reconstruction by using the patent in suit as a guide through the maze of prior references, combining the right reference in the right way so as to achieve the result of the claims in suit." Grain Processing Corp. v. American Maize-Products Corp., 5 USPQ2d 1788 (Fed. Circ. 1988). The Appellants submit that the Examiner has used improper hindsight in reconstructing the invention. To give a skilled artisan the two cited references alone, without also giving him the particular problem to be solved, i.e. the problem of simplifying the manufacture of an optical module by integrally forming the entire housing structure to include an fiber coupling means and a light beam redirection component while also fully embedding the entire optoelectronic device within the integrally formed structure would not provide any motivation to combine the features to result in the claimed invention.

While clearly one could assemble virtually any known device from a combination of prior devices by simply picking and choosing the appropriate constituent elements from prior art references, the standard of law requires that the references provide some basic teaching or suggestion that would motivate the combination. There is simply nothing explicit or implicit in DeAndrea, Leas or King that would motivate someone skilled in the art to replace the elements as cited by the Examiner without first having knowledge of the Appellant's intended device. DeAndrea is a completed and sealed device in its own right. There would be no motivation to use a vapor deposition process within the housing of the DeAndrea reference as is taught by Leas to arrive at the present invention. Further, even if this combination were utilized, the present invention would not result. Further, the Leas encapsulant could not be utilized to integrally form the fiber coupling interface because the fiber coupling interface was formed as a part of the DeAndrea housing. This argument can also be applied directly to King wherein the encapsulant material is not formed in a manner so as to integrally embed a beam redirection means and simultaneously form a fiber coupling interface. Accordingly, a combination of the disclosures again would result simply in filling the DeAndrea housing with potting compound. The combination of the cited references clearly would not arrive at the present invention as claimed and certainly would simply not be obvious from a reading of only the cited references. The wholesale and random replacement of elements without motivation or teaching is clearly improper under the law.

In view of the foregoing arguments, it is believed that the rejections under 35 U.S.C. §103 are overcome.

Accordingly, the Appellants respectfully solicit reversal of the final rejection and allowance of claim 60.

Appellants waive oral hearing.

The required fee of $330.00 under 37 C.F.R. §1.17(f) is submitted herewith.

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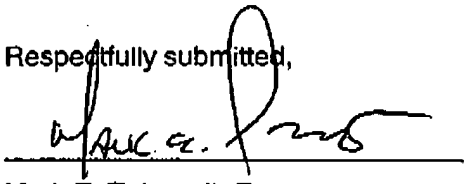
Respectfully submitted,



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APPENDIX

Claims on Appeal

60. An optical device package comprising:

a substrate having a mounting surface;

an optoelectronic device having a lower mounting surface operably coupled to said mounting surface of said substrate wherein said optoelectronic device is in electrical communication with said substrate,

said optoelectronic device further having an active upper surface disposed substantially parallel to said mounting surface of said substrate and being configured to emit or receive light normal to said active upper surface

an optically transparent fiber coupling assembly having a body portion that is integrally molded with said optoelectronic device such that said optoelectronic device is embedded within said fiber coupling assembly, said body portion being configured and arranged to transmit light,

said fiber coupling assembly further having a barrel portion extending from said body portion in a direction substantially parallel to said substrate, said barrel portion being configured to operably engage a fiber optic cable,

said fiber coupling assembly further having a planar mirror embedded within said body portion of said fiber coupling assembly to reflect said light traveling within said body portion; and

an enclosure coupled to said substrate that houses said optoelectronic device.